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ABSTRACT

This paper attempts to define the future role of research personnel in the public schools. It surveys the methods of applied and basic research and finds both inadequate for bringing about specific changes in the schools. Educational research and development is suggested as an alternative. This research and development cycle involves finding and studying research pertinent to a product to be developed, developing the product, testing it in the field to find its deficiencies and then revising to correct these deficiencies. It would be inefficient for each local school system to attempt this process on its own. Rather, public school research personnel should support such efforts by identification and preliminary evaluation of new innovations, field testing of new educational products, selecting from available products those best suited to local needs, and implementing the products selected into local schools. (RT)

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TRAINING PUBLIC SCHOOL RESEARCH PERSONNEL FOR A ROLE IN EDUCATIONAL RESEARCH AND DEVELOPMENT

by

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The Function of Public School Research Personnel

If we are to determine what training is needed by the public school research worker, it seems logical to examine the present and probable future roles of such persons, then develop a job description that describes the specific tasks that must be performed to fill these roles, and finally, propose an instructional strategy which is appropriate for developing the performance levels we have established. In this paper I will be concerned primarily with the first of these steps, that is, defining the future role of research personnel in the public schools. However, I also have views about the specific job skills needed and the most effective ways to develop these skills, which will probable come out in our later discussion.

First, let's consider the broad function of public school research personnel. I would suggest that this function is to incorporate into the schools more effective means of bringing pupils to the terminal performance levels defined in the school's educational objectives.

School Improvement Through Basic and Applied Research

Today, most public school research programs attempt to serve this function by conducting applied research projects designed to answer questions about the

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SP005 132

relative effectiveness of different educational processes or products. Although applied research is a legitimate means of bringing about educational improvement, it has not proven to be a very powerful approach. This is because applied research is useful only in evaluating products or processes that already exist and is not an adequate methodology for the development of new processes or products.

Most of the products now in use in education are poorly developed and most of the processes are poorly defined. Thus, the applied researcher usually compares poorly designed, unproven, and incomplete products to learn which is less inadequate. This procedure usually produces negative or inconclusive results and at best brings about progress at a glacially slow rate. Because of the poor quality of the products being studied, most applied research studies find differences which, although reaching the lower limits of statistical significance, have no practical significance in the regular classroom.

Thus, I would suggest that applied research is a weak strategy for bringing about educational improvement and, therefore, should not be the major task of the public school researcher.

Basic research in education and the behavioral sciences, although of major importance in bringing about educational improvement, is too far removed from the classroom to be a suitable function for public school research personnel. Basic research provides the raw material from which changes in educational practice are eventually produced. However, the gap between basic research and educational practice is so great that the personnel of a local school district could work for a lifetime on worthwhile basic research problems without improving the schools in which they are employed one whit.

School Improvement Through Educational R & D

At this point, research based development, or educational research and development (as it is usually called), appears to be the most promising process for bringing about educational improvement. Because educational research and development is relatively new in education, it is fitting to define this term and show how it differs from educational research, which in the past has been considered the major route to improvement in education. Educational R & D refers to a process used in the development and validation of educational products. The essential element in this process may be called the R & D cycle. This cycle consists of finding and studying research pertinent to a product to be developed, developing the product, testing it in the field to find its deficiencies and then revising to correct these deficiencies. In the more rigorous R & D activities, this cycle is repeated until objective field test performance data indicate that the product meets its objectives.

In contrast, educational research has as its goal, not the development of educational products, but the answering of specific questions (in the case of applied research) or the discovery of new knowledge (in the case of basic research). Of course, many applied research projects involve educational products. For example, if a project is concerned with the effectiveness of two instructional methods in teaching reading, materials exemplifying the two methods must be developed. Typically, however, these materials are developed only to the point where they can be used to test the investigator's hypothesis. Thus, in educational research, the product (if any) is a means to an end while in educational R & D, the product is the end. For this reason, it is very rare for products to come out of educational research projects that are ready for operational use in the

classroom. The result is that educators have for many years been seeking a way to bridge the gap between research and practice. This is, of course, precisely what educational Research and development does--it takes the ideas and evidence generated by research and builds tested products that are ready for use in education.

Since the educational R & D cycle includes field evaluations of the product, part of this cycle is essentially the same as an applied research project. The educational R & D process, however, goes much further than applied research, and has as its outcome a fully tested educational product rather than merely the answer to an applied research question.

Basic research, applied research and R & D all play an important part in the process of bringing about educational change. However, since R & D provides the final step necessary to translate research findings into usable educational processes and products, it would seem that this aspect of the research continuum is most pertinent to public school research personnel.

The failure of educational research to make a major impact on educational practice has been due mainly to the absence of any substantial R & D effort in education. Such an effort is now underway and public school research personnel must be trained to contribute to this effort and incorporate its products into their schools.

Educational R & D at the Local Level

At this point you may have concluded that I am proposing that public school research personnel should be trained to be educational R & D specialists. However, this is not the case. I am proposing that these persons be trained to make those contributions to the educational R & D process that:

(1) Can be made most effectively by persons in the public school setting;

(2) Are most pertinent to their main function of bringing about educational improvement in their schools.

I do not believe that the tremendous R & D effort needed to improve education should be borne by the local schools. There is one overriding reason why most local school districts cannot and probably should not attempt to carry on major educational research and development to improve local programs. The development of major educational products for local use is economically impractical.

Educational research and development is a very costly process. This process is not economically feasible unless the resulting product is used very widely. For example, a major program at the Far West Laboratory is concerned with the development of minicourses. Minicourses are fully contained instructional packages designed to train inservice teachers in the use of specific teaching skills. Our instructional model uses filmed model teachers who demonstrate the skills and videotape feedback of lessons in which the learner practices the skills in a microteaching situation. Our R & D process requires field testing and revising each course at least three times and provides for the collection of pre- and post-course performance data to determine if teachers taking the course can perform the skills in their regular classrooms. A typical minicourse requires about 18 months to carry through our complete R & D cycle. During this time about seven thousand man-hours of effort are expended on the course and the direct development cost comes to about $100,000. If we take Minicourse 1 as an example, there are about 614,000 teachers in elementary schools in the United States who are at the appropriate grade levels for this course (Simon & Grant, 1968). If one out of every ten teachers takes this course, the development cost per teacher is only $1.63.

Let us now suppose that each school district having over 25,000 pupils attempted to develop its own minicourse. If each spent $1,000, or one per cent of the Far West Laboratory development cost on its course, the total development costs would be $170,000. Furthermore, this level of resources would result in production of 170 poorly developed and inadequately tested courses. Considering the cost of educational R & D, it is doubtful that any school district has financial resources to meet more than a small part of its local needs through application of a rigorous research and development procedure.

The Role of Public School Research Personnel in Educational R & D

Although local school districts should rarely, if ever, assume the main responsibility for major educational R & D efforts, they do have an important role in support of such efforts. If educational research and development is to succeed in bringing about improved education, public school research personnel must make four critical contributions to the development, testing, and dissemination of R & D products. These contributions involve:

(1) Identification and preliminary evaluation of new innovations;

(2) Field testing of new educational products;

(3) Selecting from available products those best suited to local educational needs;

(4) Implementing the products selected into local schools.

Identifying Promising Innovations

The initial identification and planning of new educational developments is probably the most important task that public school research personnel should assume. The classroom teacher will probably always be the best source of promising

new approaches and ideas that can be built into practical educational improvements through research and development. There have always been creative teachers who have discovered and explored new and promising educational approaches in their own classes. But such teachers have almost never had the resources nor the expertise necessary to develop their innovations to a point where others could use them effectively. Thus, many promising innovations in education have flourished briefly in a few classrooms and then faded away. Public school research personnel should be trained to locate promising innovations that occur in their schools and to carry out <u>preliminary</u> development and evaluation of such innovations. Preliminary development and evaluation can be carried out at a relatively low cost. If the results of this preliminary work justify further development, the public school research staff should seek help from a regular R & D agency, such as a regional laboratory, a university, or an educational R & D center, to develop a finished product. The development cost should not be borne by the local school since the ensuing product would be used by many schools throughout the nation. Preliminary development costs should probably be supported by a federal program similar to the USOE Small Contract Program. Foundations and Federal programs seem to be the most logical funding sources for major R & D activities.

<u>Field Testing Educational Products</u>

The second point in the R & D cycle where public school research personnel can make an essential contribution is during the field testing of new products and processes. The main basis for improving any educational product must be feedback from the user in the field. Educational products that are not thoroughly tested under a variety of field conditions are almost certain to have major flaws

that will show up when the product goes into general use. The rigorous development of an educational product requires recycling of the process of field testing, evaluation and revision until the product achieves its objectives, i.e., does the job for which it was built.

Experience with educational development efforts such as the minicourse and the new mathematics and science curricula indicates that at least three field tests are usually required to fully develop and test an educational product. During this process, the input from teachers involved in the field tests gradually molds the initial product into one that achieves its objectives and can be used effectively in the real world of the classroom.

At present, most of the field testing of new educational products is carried out by the R & D agencies. It would be desirable, however, for public school research personnel to take over most of the control of field tests. This would reduce the danger of bias that is always present when the agency that develops a product also evaluates that product. It would also provide better feedback to the developer since teachers trying the product would be more frank and critical in interviews with public school research personnel who are perceived as in-group members than with investigators from an outside agency. Thus, an important part of the training of public school research personnel should be concerned with the design and execution of rigorous field evaluation studies of new educational products and processes.

Product Selection

The third area in which public school research personnel must function effectively is in the selection of educational products for use in local schools. We have already reached a point where schools must choose among several thoroughly

tested and developed mathematics and science curricula. Hopefully, within ten years, the school will have a choice of at least two proven educational products for virtually every major educational objective.

At this point the most important task for the local school will be to select from among this array of proven products the unique combination that best suits local needs. Such selection is a complex and sophisticated task and one which few schools are currently prepared to perform. Training of public school research personnel should place heavy emphasis upon the skills needed to serve this essential function.

Product Implementation

Finally, public school research personnel must be trained to implement new educational products into the ongoing school program. The best educational products currently being developed by R & D agencies attempt to provide complete packages of materials designed to facilitate implementation. However, even with these products, a competent local implementer can do much to smooth the teacher's adjustment to the new product and increase the teacher's effectiveness in its use. Introducing new approaches requires skill in human relations and sensitivity to the anxieties and commitments of the teachers involved as well as a thorough understanding of the product itself.

In summary, I consider the function of public school research personnel to be to bring about educational improvement in their schools. Since neither basic nor applied research in education has proven to be a powerful strategy for bringing about such improvement, I have suggested that the public school researcher can best bring about desirable changes in the schools he serves by contributing to educational research and development and implementing its

products. Specifically, public school research personnel should be trained to carry out four major tasks:

(1) Identifying and initially developing promising local innovations;

(2) Field testing products developed by other educational agencies;

(3) Selecting from among available educational products the best developed and most appropriate for the schools he serves; and

(4) Implementing new educational products in the local school program.